Safety-Tethered Cricket Bails

Single-Thread Loop with Weighted Collar and Retainer Stop

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1. Abstract

A light, retrofit system for securing cricket bails using a freely moving, low-mass collar, one or more tethers, and fixed rubber-band retainers. The assembly prevents bails from flying off and injuring players while preserving normal wicket sensitivity. The design installs on existing stumps and bails without modification and can be assembled or removed within one minute. All components are lightweight, inexpensive, and can be locally manufactured.

2. Technical Description

2.1 Core Components (metric-first units)

- **Collar:** PVC coupling cut to approx. 15 mm height; 38 mm inner diameter (1.5 in); mass approx. 15 g.
- **Tether:** Braided polyester or micro paracord, 900–920 mm length (approx. 3 ft), 1.2–1.5 mm diameter. The tether may be non-elastic or mildly elastic (elongation limited to approx. 20% under normal load), provided it maintains tautness under gravity without excessive rebound or sagging.
- **Bail O-Rings (wooden bails):** Silicone or EPDM, inner diameter approx. 17–18 mm with cross-section approx. 2.4 mm.
- **Bail O-Rings (LED bails without knurling):** Dual-ring arrangement recommended. For a secure friction fit on smooth spigots, select O-ring inner diameter approx. 1–2 mm smaller than the bail spigot outer diameter, with cross-section 2.0–2.5 mm. Example: for a 10 mm spigot OD, use ID 8–9 mm with 2.0–2.5 mm CS; place one ring on each side of the bail collar and tie the same tether to both for balance.

- **Retainer band (stump):** EPDM or silicone rubber band, approx. 32 mm (1.25 in) inner diameter, 12–13 mm width (approx. 0.5 in), and 3–4 mm thickness, positioned approx. 25 mm above the collar (approx. 1 in).

2.2 Functional Principles

1. **Weighted Collar Tensioning.** The collar's mass maintains consistent downward tension on the tether, preventing lateral sway from wind.
2. **Free Vertical Play for Natural Dislodgement.** The collar can move freely within an approx. 25 mm range below the retainer band, allowing bails to dislodge normally while limiting travel.
3. **Shatterproof Safety Components.** All parts are non-metallic and shatter resistant (PVC, EPDM, silicone, or polyester). No screws, nails, or rigid connectors are used, preventing splintering or injury.
4. **Terminology** – *"Cross talk"*. In this document, cross talk means interference where movement of one bail affects the other. The collar mass should be sufficient to keep the tether taut by gravity, but not so heavy that it resists bail dislodgement or induces cross talk.

2.3 Assembly and Operation (metric first)

1. Tie both O rings securely to the ends of the tether thread.
2. Insert each O ring onto the respective bail so it sits firmly against the knurling or collar of the bail (use dual rings for smooth LED bails).
3. Loop the tether once around the collar to ensure balance and self-centering tension.
4. Slide the collar onto the center stump, positioning it approximately 120 mm below the top (approx. 4.7 in).
5. Place a rubber band around the center stump approx. 25 mm above the collar (approx. 1 in).
6. (Optional for non-spring-loaded stumps) Place an additional rubber band approx. 25 mm below the collar to prevent ejection if the entire stump lifts upon impact.
7. When the ball strikes the wicket, the bails lift and fall normally, the tether limits excessive travel, and the collar rises slightly before settling back by gravity.

2.4 Design Parameters (metric standardized)

- Collar clearance on stump: approx. 1–2 mm radial play.
- Collar vertical movement range: up to approx. 25 mm below the retainer band.
- Collar mass guideline: approx. 15 g; just sufficient to keep the tether taut by gravity, but not so heavy that it resists bail dislodgement or induces cross talk (as defined above).
- Tether length: target 900–920 mm (approx. 3 ft).
- All edges rounded (minimum 2 mm radius) for handling safety.
- Materials UV resistant (PVC, EPDM, silicone, polyester).

3. Advantages

- Fits existing stumps and bails in under one minute; no redesign needed.
- Prevents injuries from flying bails.
- Retains Law of Cricket sensitivity.
- Low cost (approximately $1 USD per set, depending on materials).
- Installs easily and durable for all levels of play.
- Weighted collar keeps tether taut and eliminates wind induced movement.
- All materials are shatterproof and non-metallic for player safety.

- Low maintenance; reusable for multiple games.

4. Regulatory Context

This design complies with **Law 8.3.4** of the MCC Laws of Cricket (2017 Code):
"Devices aimed at protecting player safety by limiting the distance that a bail can travel off the stumps shall be permitted, subject to the approval of the Governing Body for the match and the ground authority."
The mechanism ensures bails lift and fall naturally while the collar and retainer limit excessive movement, aligning with the safety intent of Law 8.3.4.

5. Defensive Publication

Notice This disclosure constitutes a Defensive Publication establishing prior art under international patent law. It prevents any party from obtaining exclusive patent rights on the safety tethered bail mechanism, its weighted collar configuration, or any equivalent method that limits bail travel without restricting dislodgement.

This protection expressly includes, but is not limited to, functional equivalents employing:
- single or multiple tethers or threads,
- weighted or freely moving collars,
- retaining rings, rubber bands, or stoppers on the stump,
- and any material, shape, or configuration achieving similar results through these principles.

This protection extends to equivalent mechanisms mounted on any stump (center, off, or leg), including partial collars, arcuate or segmented guides, or similar weighted assemblies providing tether tension or bail travel limitation by gravitational means.

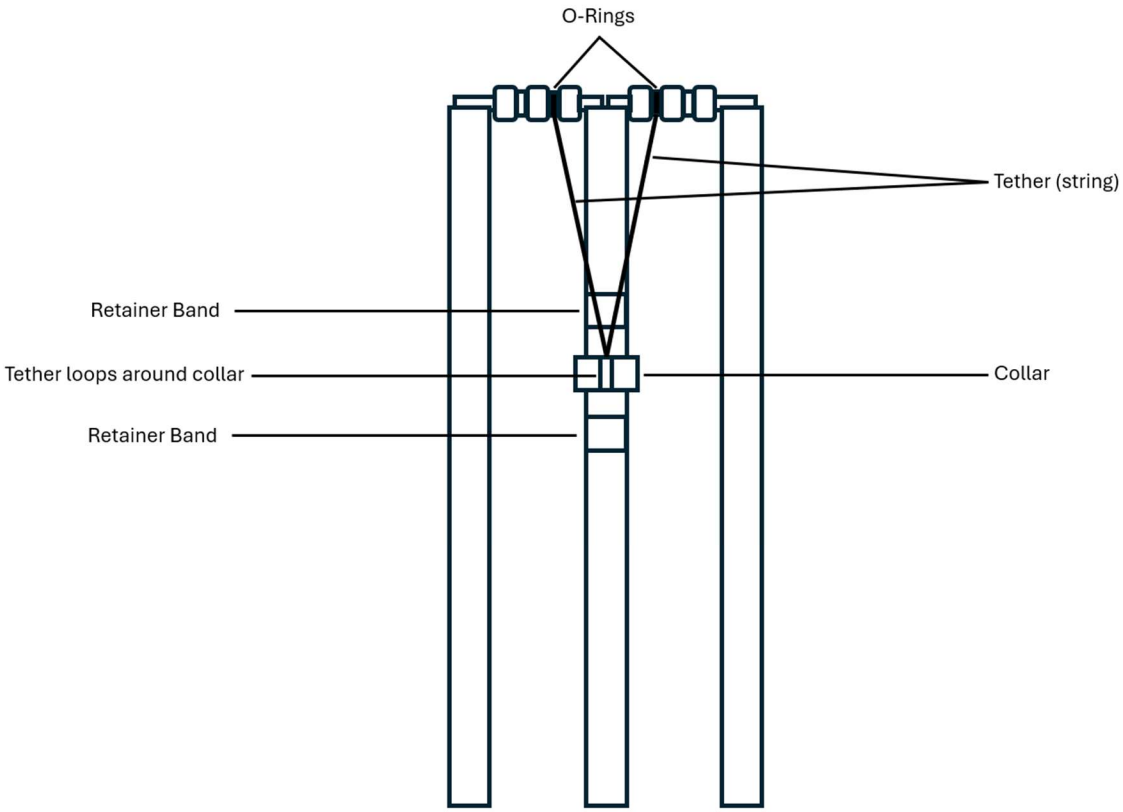
This document is released publicly under Creative Commons Attribution 4.0 International (CC BY 4.0) to encourage open innovation, safety improvement, and global adoption.

6. Versioning Note

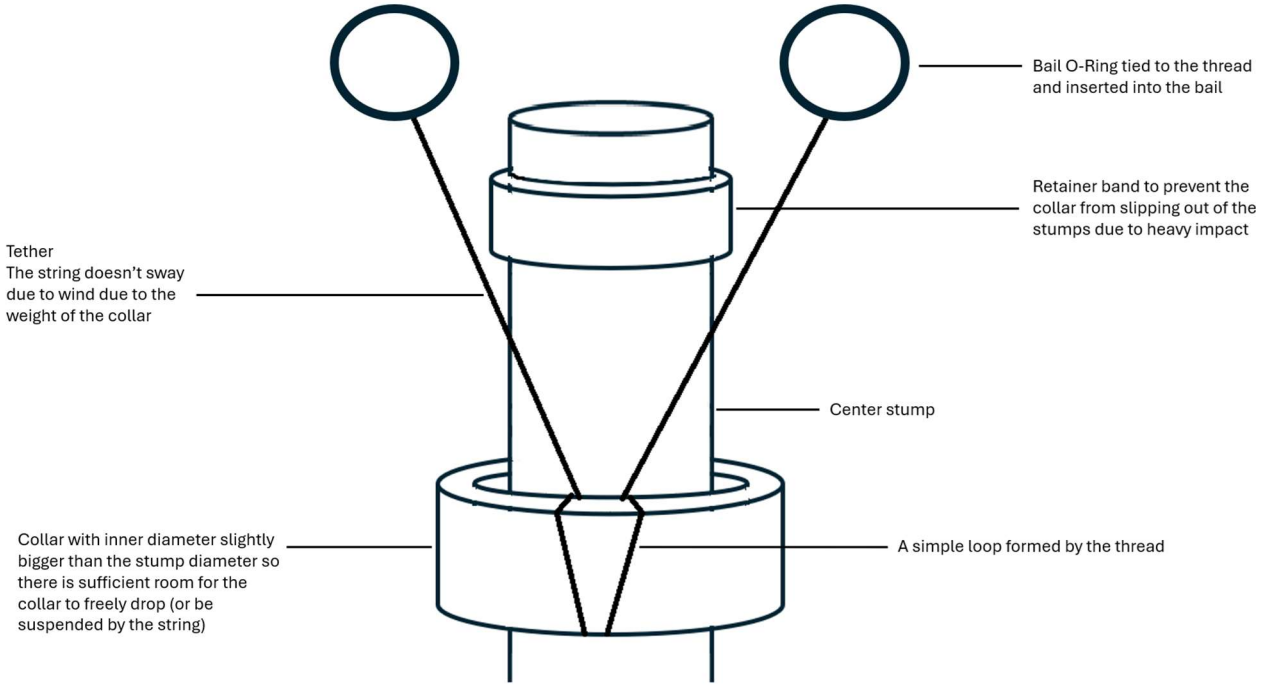
This record is intended to be immutable for prior art purposes. Subsequent improvements or clarifications can be published as new versions (e.g., v4, v5) under the same CC BY 4.0 license, citing this disclosure for continuity.

7. Figures and Illustrations

- Fig 1 - Front view of center stump with collar, tether, bail O-rings and retainer band *(not to scale)*



- Fig 2 – A closer look at the collar arrangement *(not to scale)*


Bail O-Ring tied to the thread and inserted into the bail
Retainer band to prevent the collar from slipping out of the stumps due to heavy impact
Tether
The string doesn't sway due to wind due to the weight of the collar
Center stump
Collar with inner diameter slightly bigger than the stump diameter so there is sufficient room for the collar to freely drop (or be suspended by the string)
A simple loop formed by the thread

- Fig 3 – How to loop around the collar with the single thread *(not to scale)*

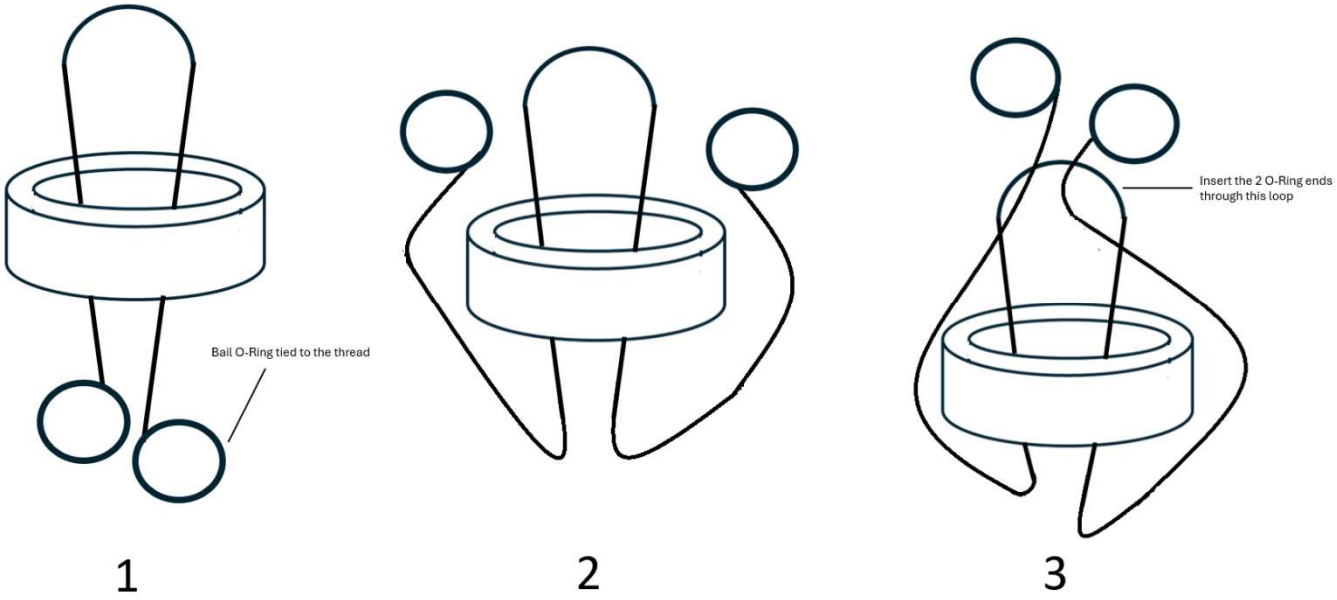


Fig 4 - Photograph of assembled safety-tethered bail system installed on standard wooden stumps

- Fig 5 - Photograph (video still) showing collar, tether routing, and retainer placement at the moment of bail lift

- Fig 6 - Photograph of an assembled safety-tethered bail system using dual independent tethers with a gravity-biased collar

8. Alternate Design Concepts Considered

During prototyping and testing, several variations were evaluated to compare performance, installation ease, and compliance with Law 8.3.4. These included:

- **Dual-thread configuration:** Two independent tethers connecting the collar to each bail. This setup functions acceptably but is less preferred due to longer setup time and difficulty maintaining perfectly equal thread lengths after knotting, which can slightly affect bail balance.
- **Fixed-collar mount:** Offered more stability but restricted natural bail lift, non-compliant with Law 8.3.4.
- **Tight-fitting (piston-type) collar:** A snug or piston-style collar that slid closely over the stump was tested but rejected. While it offered a more rigid connection, it required precisely sized components that were difficult to source consistently and interfered with the natural bail lift when struck.
- **Direct stump-tied tether:** A string fixed directly between bails and the stump without a weighted collar; rejected as it swayed under wind, could tangle with the bat or gloves, and failed

to self-center. When tensioned tightly to reduce sway, it restricted the natural lifting of the bails upon impact.

- **Elastic-cord or high-stretch designs:** Configurations using highly elastic or bungee-style cords—either looped through a collar or tied directly to the stump—were rejected. Such cords store excessive tension, were difficult to source consistently, and interfered with natural bail lift by introducing rebound. This does not preclude the use of mildly elastic (low stretch) materials as described in Section 2.1.
- **Hook, clamp or screw-mounted tether:** Designs using hooks, clamps, screws, or nails fixed into the stump were rejected as they required modification to existing stumps, added safety risks, and violated the principle of a fully retrofit solution.
- **Modified off or leg stump mounts:** Mounting the tether mechanism on the off or leg stump was rejected because it increased the visual and physical surface area of the stumps, potentially altering deflection behavior and bowled dismissals, thus impacting fairness and compliance with the Laws of Cricket.

These alternate configurations are recorded to document design evolution and to ensure that functionally equivalent mechanisms remain open, freely usable, and protected within the public domain under the same Creative Commons Attribution 4.0 International (CC BY 4.0) license.

Commercial Implementation Note (Clarification)
While the dual-thread configuration was noted above as less preferred for manual, field-assembled prototypes due to the difficulty of achieving perfectly equal tether lengths after hand-knotting, this limitation is specific to non-controlled assembly conditions.

In a commercial or mass-manufactured implementation, where tether lengths can be precisely controlled during fabrication, the dual-thread configuration offers increased redundancy and fault tolerance. Each bail remains independently restrained even in the unlikely event of a single tether failure.

Accordingly, in manufactured products, training equipment, or standardized safety devices, a dual-thread configuration may be commercially preferred while remaining fully compliant with Law 8.3.4 and the functional principles disclosed herein.

9. Photographic Embodiments and Physical Prototypes

This version includes photographic documentation of physical prototypes assembled and tested on standard wooden cricket stumps and bails.
The photographed embodiments demonstrate real-world implementations of the safety-tethered bail mechanism using readily available materials and simple assembly methods. The images illustrate:

- One or more tethers connecting the bails to a gravity-biased collar
- A gravity-biased collar mounted on the center stump
- One or more retainer elements limiting vertical travel of the collar
- Bail attachment using O-rings, friction loops, or equivalent non-rigid connectors
- Natural bail lift and dislodgement upon impact, with post-dislodgement travel constrained

The photographic embodiments confirm that the disclosed mechanism functions as intended under practical conditions and that precise materials, dimensions, or collar geometries are **non-essential** to the operation of the invention.

All photographed assemblies operate under the same functional principles described in Sections 2.1–2.4 and are considered **functionally equivalent embodiments** of the disclosed system.

Photographed dual-tether embodiments further demonstrate the practical viability and redundancy advantages of independently tethered bails.

10. Expanded Alternate Embodiments (Clarifications)

In addition to the alternate design concepts recorded in Section 8, the following variations are expressly disclosed and intended to remain within the scope of this defensive publication:

- **Collar variations**, including solid rings, split rings, segmented collars, partial collars, fixed-mass collars, adjustable-mass collars, and collars fabricated from rigid, semi-rigid, or elastomeric materials
- **Tether routing variations**, including single-loop or multi-pass routing through or around the collar; knotted, friction-locked, zip-tied, or molded loop terminations; and the use of low-stretch or mildly elastic cords, provided rebound does not interfere with natural bail lift
- **Retainer variations**, including one or more retainers positioned above the collar, below the collar, or on both sides of the collar, implemented as bands, rings, stops, or equivalent non-rigid elements

Any configuration that:

1. Allows the bails to dislodge naturally when struck, and
2. Limits excessive post-dislodgement bail travel using a tether influenced primarily by gravity

shall be considered a functionally equivalent embodiment of the safety-tethered bail mechanism disclosed herein.

Collar geometry variations:
While the collar is generally described as a hollow cylindrical body fitted over the center stump, minor geometric variations are expressly disclosed. These include differences in mass distribution, wall thickness, internal cavities, drilled or molded holes, ribs, fins, wings, surface projections, segmented constructions, or localized structural features. Such variations may be employed for weight tuning, material efficiency, airflow, durability, or manufacturing convenience, provided the collar remains freely movable along the stump and gravity-biased. All such configurations are considered functionally equivalent embodiments and are intended to fall within the scope of this disclosure.

11. Versioning and Continuity Note (v3.0)

This document constitutes **Version 3.0** of the *Safety-Tethered Cricket Bails* defensive publication.

Version 3.0 adds photographic evidence of physical prototypes, clarifies additional alternate embodiments, and expands the documented safety context. No claims, principles, or protections established in Version 2.0 are withdrawn, narrowed, or superseded.

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